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| <b>13. SUPPLEMENTARY NOTES</b>  |                         |  |  |  |   |
| <b>14. ABSTRACT</b><br>The Radiation Health Branch of the U.S. Air Force School of Aerospace Medicine completed a site visit and an independent radiological assessment of the Dudley Boulevard site, former McClellan AFB, CA, from 26-29 Sep 11. The letter details the findings of this visit and is meant to assist the Radioisotope Committee Secretariat when evaluating the contractor's final status survey of the Dudley Boulevard site.   |                         |  |  |  |   |
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| <b>a. REPORT</b><br>U   | <b>b. ABSTRACT</b><br>U | <b>c. THIS PAGE</b><br>U                     |  |  | <b>19b. TELEPHONE NUMBER (include area code)</b>        |



**DEPARTMENT OF THE AIR FORCE**  
**AIR FORCE RESEARCH LABORATORY**  
**WRIGHT-PATTERSON AFB OHIO**

21 May 12

**MEMORANDUM FOR AFMSA/SG3PB**

Attn: Dr. Ramachandra Bhat, CHP  
USAF Radioisotope Committee Secretariat  
Air Force Medical Support Agency  
1500 Wilson Blvd, Suite 1600  
Arlington, VA 22209

**FROM:** USAFSAM/OEHH  
2510 Fifth Street, Bldg 0840  
WPAFB, OH 45433

**SUBJECT:** Consultative Letter, AFRL-SA-WP-CL-2012-0055, Dudley Boulevard Site Visit  
at Former McClellan AFB, Sacramento, CA

1. At the request of your office, the Radiation Health Branch of the United States Air Force School of Aerospace Medicine (USAFSAM/OEHH) completed a site visit and an independent radiological assessment of the Dudley Boulevard site, former McClellan AFB, CA, from 26-29 Sep 11. Maj Alan Hale (USAFSAM/OEHH) was sent to conduct the site visit. This letter details the findings of this visit and is meant to assist the Radioisotope Committee Secretariat when evaluating the contractor's final status survey of the Dudley Boulevard site.
2. Background. During a 1996 Environmental Protection Agency van scan of the former McClellan AFB, Sacramento, CA, a site was found to have Radium-226 contamination. A 2007 characterization survey conducted by Cabrera Services determined that the site's asphalt and shallow soils were impacted by Radium-226 and that Radium-226 was the sole contaminant of concern. The affected area was approximately 1,000 m<sup>2</sup>. Environmental Dimensions, Inc. (EDi), under contract with CH2M Hill, is conducting remediation activities and the final status survey.
3. Scope. The purpose of this site visit, per your office's request, was the observation of the remediation activities, observation of survey work, and collection of measurements utilizing the contractor's equipment.
4. Results and Discussion. The results are summarized below along with some basic discussion.
  - a. General observations. EDi's project activities were safety focused. The contractor had an appropriate health and safety plan in place. Proper contamination control practices, personal

protective equipment, area high volume air sampling, personal lapel air sampling, and decontamination practices were followed.

b. EDi surveys. EDi was conducting real-time field measurements to ensure that only contaminated areas were excavated and to define any new areas. EDi utilized a Ludlum 2221 rate meter coupled with a Ludlum 44-10 2x2-inch NaI probe to perform monitoring. Due to excavation and roll off bin delivery delays, the site was not fully remediated and had not had the final status survey completed. However, the survey techniques, methodology employed, and knowledge demonstrated by EDi personnel during the remediation surveys should translate into a competent final status survey when performed.

c. USAFSAM independent measurements. USAFSAM conducted gamma walkover surveys and collected soil samples during EDi remediation activities. The target remediation areas, labeled as A-1 through A-4 and pavement removal area, are denoted in Attachments 1 and 2. These were the projected areas the contractor represented in the field sampling plan. The actual survey unit delineation had not been finalized, so the gamma walkover survey and soil sampling were conducted where remediation had taken place, within the expected survey unit(s). Note that the maps are not geospatially referenced (GPS coordinates), as the data provided by the contractor was in AutoCAD and would not import into our mapping software. The target remediation areas were labeled for comparison to the contractor's final status survey once complete, which should also have the same remediation areas labeled.

(1) Gamma walkover survey. Gamma walkover surveys were conducted with EDi's Ludlum 2221 rate meter (S/N 117651, calibrated 8 Mar 11) coupled with a Ludlum 44-10 2x2-inch NaI probe (S/N 0533, calibrated 30 Mar 11). The same technique was employed where the detector was held no more than 4 inches above the surface. The rate meter was linked to a GPS device so the data could be geospatially plotted. The mean count rate of the said detection was 8505 counts per minute (cpm) as determined by the contractor in a nonimpacted area. The count rate the contractor determined was not an average of a series of walkover measurements, so the standard deviation was taken as the square root of the measurement. EDi was encouraged to collect a statistically significant series of walkover measurements to determine a better mean with standard deviation for use in the final status survey data reduction. Attachment 1 details the results of the walkover survey. The green represents readings less than or equal to 8782 cpm (mean plus three standard deviations), whereas the red areas denote readings greater than 8782 cpm. Note that these readings are largely qualitative, and the red readings do not correspond to readings greater than the derived concentration guideline level but rather to readings statistically significant, that is, readings that are likely above background levels.

(2) Soil samples. Soil sampling was conducted in the vicinity of the four projected excavation areas and the pavement removal area as outlined in their field sampling plan. The locations and results for the soil samples can be found in Attachment 2. Samples were collected in judgmental areas in which it was thought that remediation was complete at the time of soil sample collection (29 Sep 11). The soils were analyzed at the Air Force's Radioanalytical Laboratory using the appropriate in-growth method to determine Radium-226 levels in soil. The values reported for Radium-226 are, in fact,

the values using Lead-214 as a surrogate. Reporting Lead-214 activity concentrations, rather than the Bismuth-214, or an average of the two, is worst-case and potentially represents about 10% conservatism.

5. Recommendations/Conclusions. While the task was completed as requested, unfortunately the independent measurements were unable to be taken after complete remediation. Therefore, the measurements represented in this report should not be used for potential unrestricted release of the site by the Radioisotope Committee Secretariat; rather, the post remediation measurements taken by the contractor should be used as the criteria for potential unrestricted release of the site. However, observations of the remediation and survey work indicate the contractor was fully competent addressing the radiological conditions at the Dudley Boulevard site.

6. If you have any questions or need further information, please contact Maj Alan Hale at 937-938-3445 (DSN 798-3445) or [alan.hale@us.af.mil](mailto:alan.hale@us.af.mil).



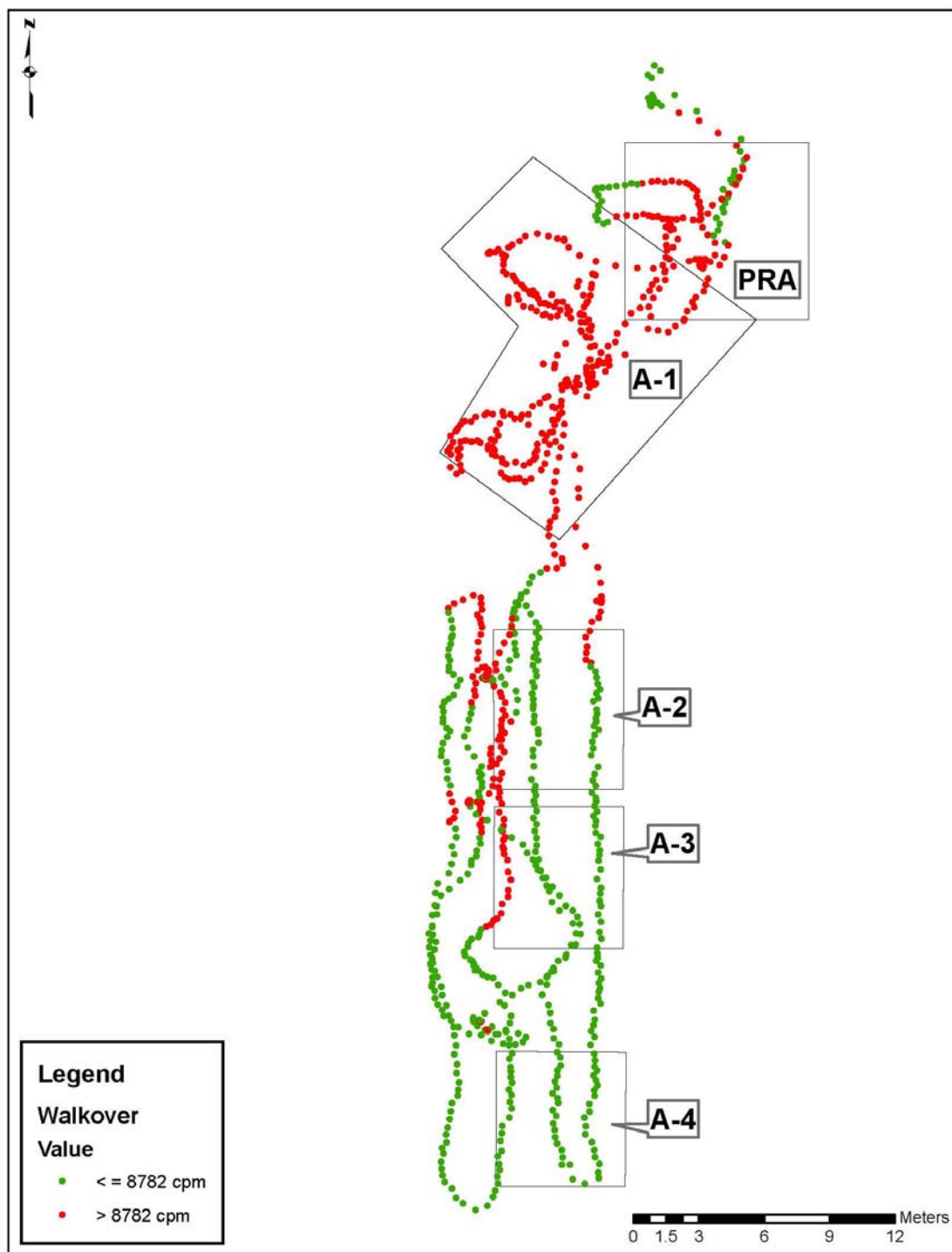
ALAN C. HALE, Maj, USAF, BSC  
Chief, Radiation Health Consulting

Attachments:

1. Gamma Walkover Data
2. Soil Sample Results

Attachment 1

Gamma Walkover Data



Attachment 2

Soil Sample Results

